<u>REMARKS</u>

The present application was filed on April 6, 2000 with claims 1-38. Claims 1, 13, 23 and 31 are the independent claims.

In view of the above amendments and the following remarks, Applicants respectfully request reconsideration of the present application.

In the Office Action, the drawings were objected to on a number of grounds. In response, Applicants submit herewith a proposed red-lined drawing change to FIGS. 1A, 1B and 3. It is believed that the proposed changes to the drawings address the objections raised by the Examiner. Accordingly, withdrawal of this objection is respectfully requested.

The specification was objected to because of various informalities. Applicants have amended the specification in a manner which is believed to overcome the objection. More specifically, the specification has been amended at page 8, line 13, in accordance with the Examiner's suggestions. Regarding page 6, lines 28-29, the second usage of the term "sub-buses" has been replaced with the term "cards." Accordingly, withdrawal of the objection to the specification is respectfully requested.

Claims 2-12, 14-22, 24-30 and 32-38 were objected to due to various informalities. These claims have been amended in a manner which is believed to overcome the objection. More specifically, claims 2-11, 14-22 and 32-38 have been amended to replace "A switch" with --The switch--, claims 24-29 have been amended to replace "A method" with --The method--, and claim 22 has been amended to replace "top" with --to--, as suggested by the Examiner. Accordingly, withdrawal of the objection is respectfully requested.

Claims 1, 2, 11, 23, 25, 27, 28, 31 and 34 were rejected under 35 U.S.C. §112, second paragraph. Each of these claims has been amended herein in a manner which is believed to overcome the rejection under §112. Accordingly, withdrawal of this rejection is respectfully requested.

With regard to the rejection of claims 1-3 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,734,656 (hereinafter "Prince"), Applicants respectfully submit that Prince does not disclose each of the limitations of amended independent claim 1. For example, Prince does not disclose a plurality of backplane sub-buses, as recited in independent claim 1. Instead, Prince relates to a switching hub in which an asynchronous transfer mode (ATM) switch is utilized as a single

backplane bus. Prince states that "the present invention allows time division multiplexing of the bus under programmatic control such that each module . . . is allowed a desired number of cell slots on the bus during which to transfer data, which the module has translated into ATM cells, across the bus" (Prince, Abstract, emphasis supplied). This type of time division multiplexed bus is specifically addressed and distinguished from the present invention in the specification, at page 1, lines 29-32, as follows:

> In some buses which use time domain multiplexing, the bus is divided into slots, and each time a transmitter needs to transmit data it requests an amount of slots. This solution, however, is too slow and complex for fast switches.

As indicated above, the present invention as recited in independent claim 1 calls for a plurality of backplane sub-buses, rather than the single time division multiplexed bus which is disclosed in Prince. Thus, it is respectfully submitted that Prince does not disclose each of the limitations of independent claim 1.

Additionally, it is respectfully submitted that claims 2 and 3, which directly depend from independent claim 1, are patentable for at least the reasons that claim 1 is patentable. Accordingly, in view of the above remarks, withdrawal of the rejection of claims 1-3 under § 102(b) is respectfully requested.

In the Office Action, each of claims 4-11 was individually rejected under 35 U.S.C. § 103(a) as being unpatentable over Prince and one or more other references. It is respectfully submitted that claims 4-11, which directly or indirectly depend from independent claim 1, are patentable for at least the reasons that claim 1 is patentable. Accordingly, in view of the above remarks, withdrawal of the rejections of claims 4-11 under § 103(a) is respectfully requested.

Claims 13, 14 and 16-18 stand rejected under 35 U.S.C. § 102(b) as being anticipated by PCT WO 93/15464 (hereinafter "Porter"). However, like Prince, Porter is directed to a single physical bus. Therefore, Porter does not disclose "a plurality of backplane sub-buses" as recited in independent claim 13. Additionally, it is respectfully submitted that claims 14 and 16-18, which directly or indirectly depend from independent claim 13, are patentable for at least the reasons that

claim 13 is patentable. Accordingly, in view of the above remarks, withdrawal of the rejection of claims 13, 14 and 16-18 under §102(b) is respectfully requested.

Each of claims 15 and 19-22 was rejected under 35 U.S.C. §103(a) as being unpatentable over Porter and one or more other references. It is respectfully submitted that claims 15 and 19-22, which directly or indirectly depend from independent claim 13, are patentable for at least the reasons that claim 13 is patentable. Accordingly, in view of the above remarks, withdrawal of the rejection of claims 15 and 19-22 under §103(a) is respectfully requested.

Claims 23-29 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,771,358 (hereinafter "LaBerge"). LaBerge is directed to a method which apportions bus bandwidth among bus requesters by assigning to each bus requester a bus bandwidth portion that is based on the bandwidth of the bus requester. More particularly, the LaBerge method "identifies a requester bandwidth for each of the bus requesters and sums the requester bandwidths to obtain a total bandwidth" and then "apportions the bus bandwidth among the bus requesters by assigning each bus requester a bus bandwidth portion that reflects the weighting value of the bus requester" (LaBerge, Abstract). Again, this arrangement involves a single physical bus without separately-identifiable sub-buses, whereas the present invention, as recited in independent claim 23, is directed to an arrangement involving a plurality of sub-buses. Therefore, it is believed that LaBerge does not disclose each of the elements of independent claim 23.

It is respectfully submitted that claims 24-29, which directly depend from independent claim 23, are patentable for at least the reasons that independent claim 23 is patentable. Accordingly, in view of the above remarks, withdrawal of the rejection of claims 23-29 under §102(b) is respectfully requested.

Claims 19, 31-33 and 35-37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Porter. As noted above, Porter is directed to a single physical bus. Independent claim 31 has been amended herein to include the limitation "wherein the at least one controller is further configurable to allocate the sub-buses to the cards based on bus demand values of the cards." It is respectfully submitted that Porter does not teach or suggest at least this limitation of independent claim 31.

It is respectfully submitted that claims 19, 32, 33 and 35-37, which directly or indirectly depend from independent claims 13 or 31, are patentable for at least the reasons that independent claims 13 and 31 are patentable. Accordingly, in view of the above remarks, withdrawal of the rejection of claims 19, 31-33 and 35-37 under §103(a) is respectfully requested.

Claims 34 and 38 were rejected under 35 U.S.C. §103(a) as being unpatentable over Porter in view of admitted prior art or another cited reference. It is respectfully submitted that claims 34 and 38, which directly depend from independent claim 31, are patentable for at least the reasons that claim 31 is patentable. Accordingly, in view of the above remarks, withdrawal of the rejection of claims 34 and 38 under §103(a) is respectfully requested.
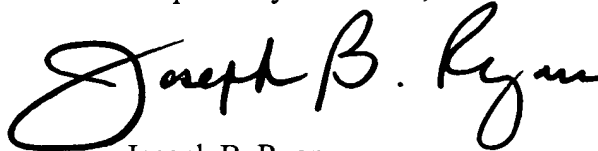
The Examiner indicated that claims 12 and 30 would be allowable if rewritten in independent form. Applicants have rewritten claims 12 and 30 in independent form, and these claims as amended are believed to be allowable.

In view of the foregoing, it is respectfully submitted that claims 1-38 as amended herein are patentably distinct over the art of record and are in condition for allowance.

In the event that the Examiner believes that a telephone conference or a personal interview may facilitate resolution of any remaining matters, the undersigned may be contacted at the number indicated below.

Attached hereto is a marked-up version of the changes made to the specification and claims by the present Amendment.

Respectfully submitted,

Date: October 31, 2002

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Enclosure(s): Proposed Red-Lined Drawing Change (3 sheets)

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IN THE SPECIFICATION

The paragraph beginning on page 6, line 27 has been amended as follows:

There is further provided in accordance with a preferred embodiment of the present invention, a modular switch, including a plurality of communication cards, a plurality of backplane sub-buses which are used for communication between groups of the [sub-buses] <u>cards</u>, and at least one controller which is configurable to divide the cards into different numbers of groups, such that the cards of the different groups do not transmit data to each other.

The paragraph beginning on page 8, line 13 has been amended as follows:

Alternatively, each card 24 has [input] <u>output</u> links 28 which connect to each of sub-buses 22, and software blocking methods are used to prevent card 24 from transmitting to sub-buses 22 it is not assigned. For example, each link 28 may be assigned to a different internal port of card 24 and the card writes to the internal ports which lead to the sub-buses 22 it is assigned.

IN THE CLAIMS

On page 21, line 2, the following has been inserted:
--What is claimed is:--

The claims have been amended as follows:

1.   (Amended) A modular switch, comprising:
        a plurality of backplane sub-buses;
        a plurality of cards which are each allocated one or more of the backplane sub-buses; and
        a controller which dynamically allocates the backplane sub-buses to the plurality of cards, based on [the] bandwidth needs of the cards.

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2.   (Amended) [A] The switch according to claim 1, wherein [the] a bandwidth capacity of substantially all the backplane sub-buses is less than the sum of [the] a maximal transmission bandwidth [capacities] capacity of the cards.

3.   (Amended) [A] The switch according to claim 1, wherein the controller is implemented by one of the cards.

4.   (Amended) [A] The switch according to claim 3, wherein the controller is implemented by one of the cards which is selected dynamically.

5.   (Amended) [A] The switch according to claim 1, wherein the cards transmit messages which indicate their bandwidth needs to the controller.

6.   (Amended) [A] The switch according to claim 1, wherein each of the cards has a priority value which indicates its entitlement to bandwidth and the controller allocates the backplane sub-buses based on the priority values of the cards.

7.   (Amended) [A] The switch according to claim 1, wherein substantially all the backplane sub-buses have the same bandwidth capacity.

8.   (Amended) [A] The switch according to claim 1, wherein the plurality of backplane sub-buses comprise at least two sub-buses with different bandwidths.

9.   (Amended) [A] The switch according to claim 1, wherein the controller confiscates one or more sub-buses from one or more of the cards when the one or more sub-buses are more needed by one or more other cards.

10. (Amended) [A] <u>The</u> switch according to claim 9, wherein the controller does not allocate a confiscated sub-bus to a card before it receives confirmation from the card from which the sub-bus was confiscated that the sub-bus was freed from its allocation.

11. (Amended) [A] <u>The</u> switch according to claim 1, wherein the controller calculates, for each of the cards, a bus demand value which represents [the] <u>an</u> entitlement and need of the card to receive a sub-bus, and the controller allocates free sub-buses which are not allocated to the cards with the highest bus demand values.

12. (Amended) A <u>modular</u> switch [according to claim 11,] <u>comprising:</u>

<u>a plurality of backplane sub-buses;</u>

<u>a plurality of cards which are each allocated one or more of the backplane sub-buses; and</u>

<u>a controller which dynamically allocates the backplane sub-buses to the plurality of cards, based on bandwidth needs of the cards;</u>

<u>wherein the controller calculates, for each of the cards, a bus demand value which represents an entitlement and need of the card to receive a sub-bus, and the controller allocates free sub-buses which are not allocated to the cards with the highest bus demand values; and</u>

<u>further</u> wherein the controller confiscates sub-buses from cards whose bus demand value without the confiscated sub-buses is lower than the bus demand value of a different card after the confiscated sub-buses are transferred to it.

14. (Amended) [A] <u>The</u> switch according to claim 13, wherein at least one of the plurality of cards listens to fewer than all the backplane sub-buses.

15. (Amended) [A] <u>The</u> switch according to claim 13, comprising a controller which dynamically changes the sub-buses to which each card listens.

16. (Amended) [A] <u>The</u> switch according to claim 13, wherein each of the cards is configured to listen to a respective group of peer cards.

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17.   (Amended) [A] The switch according to claim 16, wherein the sub-buses to which each of the plurality of cards listens are the sub-buses to which the respective group of peer cards transmit.

18.   (Amended) [A] The switch according to claim 16, wherein each card listens to the cards which listen to it.

19.   (Amended) [A] The switch according to claim 16, wherein at least one card listens to fewer than all the cards that listen to it.

20.   (Amended) [A] The switch according to claim 16, wherein the peer group of one or more cards changes as a function of time.

21.   (Amended) [A] The switch according to claim 20, wherein the peer groups are reduced in size during high security times.

22.   (Amended) [A] The switch according to claim 13, comprising for at least one of the cards a filter which passes to the card only data from the sub-buses [top] to which the card listens.

23.   (Amended) A method of allocating sub-buses to cards of a switch, comprising:
       determining [the] bandwidth needs of each of the cards;
       assigning each of the cards a bus demand value which is a function of the bandwidth needs of the card and the current bandwidth allocated to the card; and
       allocating the sub-buses to the cards based on the bus demand values of the cards.

24.   (Amended) [A] The method according to claim 23, wherein determining the bandwidth needs of the cards comprises receiving messages from the cards.

25.   (Amended) [A] The method according to claim 23, wherein determining the bandwidth needs of a card comprises determining a measure of [the] utilization of the sub-buses currently allocated to the card.

26.   (Amended) [A] The method according to claim 23, wherein determining the bandwidth needs of a card comprises listening to the sub-buses currently allocated to the card.

27.   (Amended) [A] The method according to claim 23, wherein assigning each of the cards a bus demand value comprises assigning a bus demand value which is a function of [the] a priority of the card.

28.   (Amended) [A] The method according to claim 23, wherein assigning each of the cards a bus demand value comprises assigning a bus demand value which is a function of [the] a minimal number of sub-buses which must be allocated to the card.

29.   (Amended) [A] The method according to claim 23, wherein allocating the sub-buses to the cards comprises allocating sub-buses not currently allocated to a specific card as additional sub-buses to the cards with the highest bus demand values.

30.   (Amended) A method [according to claim 23,] of allocating sub-buses to cards of a switch, the method comprising the steps of:
        determining bandwidth needs of each of the cards;
        assigning each of the cards a bus demand value which is a function of the bandwidth needs of the card and the current bandwidth allocated to the card; and
        allocating the sub-buses to the cards based on the bus demand values of the cards;
        wherein allocating the sub-buses to the cards comprises confiscating sub-buses from cards which have lower bus demand values without the confiscated sub-buses than the bus demand values of other cards with the confiscated sub-buses.

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31.   (Amended) A modular switch, comprising:

        a plurality of communication cards;

        a plurality of backplane sub-buses which are used for communication between groups of the [sub-buses] cards; and

        at least one controller which is configurable to divide the cards into different numbers of groups, such that the cards of the different groups do not transmit data to each other, wherein the at least one controller is further configurable to allocate the sub-buses to the cards based on bus demand values of the cards.

32.   (Amended) [A] The switch according to claim 31, wherein the at least one controller is configurable to divide the cards into any number of groups between one and the number of cards.

33.   (Amended) [A] The switch according to claim 31, wherein the at least one controller divides the cards into a number of groups configured by a user.

34.   (Amended) [A] The switch according to claim 31, wherein the at least one controller divides the cards into a number of groups equal to [the] a number of types of cards included in the plurality of cards.

35.   (Amended) [A] The switch according to claim 31, wherein the cards of the different groups do not communicate with each other.

36.   (Amended) [A] The switch according to claim 31, wherein the cards of the different groups do not communicate over any of the plurality of backplane sub-bases.

37.   (Amended) [A] The switch according to claim 31, comprising a box having a plurality of slots in which the cards are located and wherein the cards of at least one group are not located in adjacent slots.

38. (Amended) [A] The switch according to claim 31, wherein only one card writes to a sub-bus at any single time.
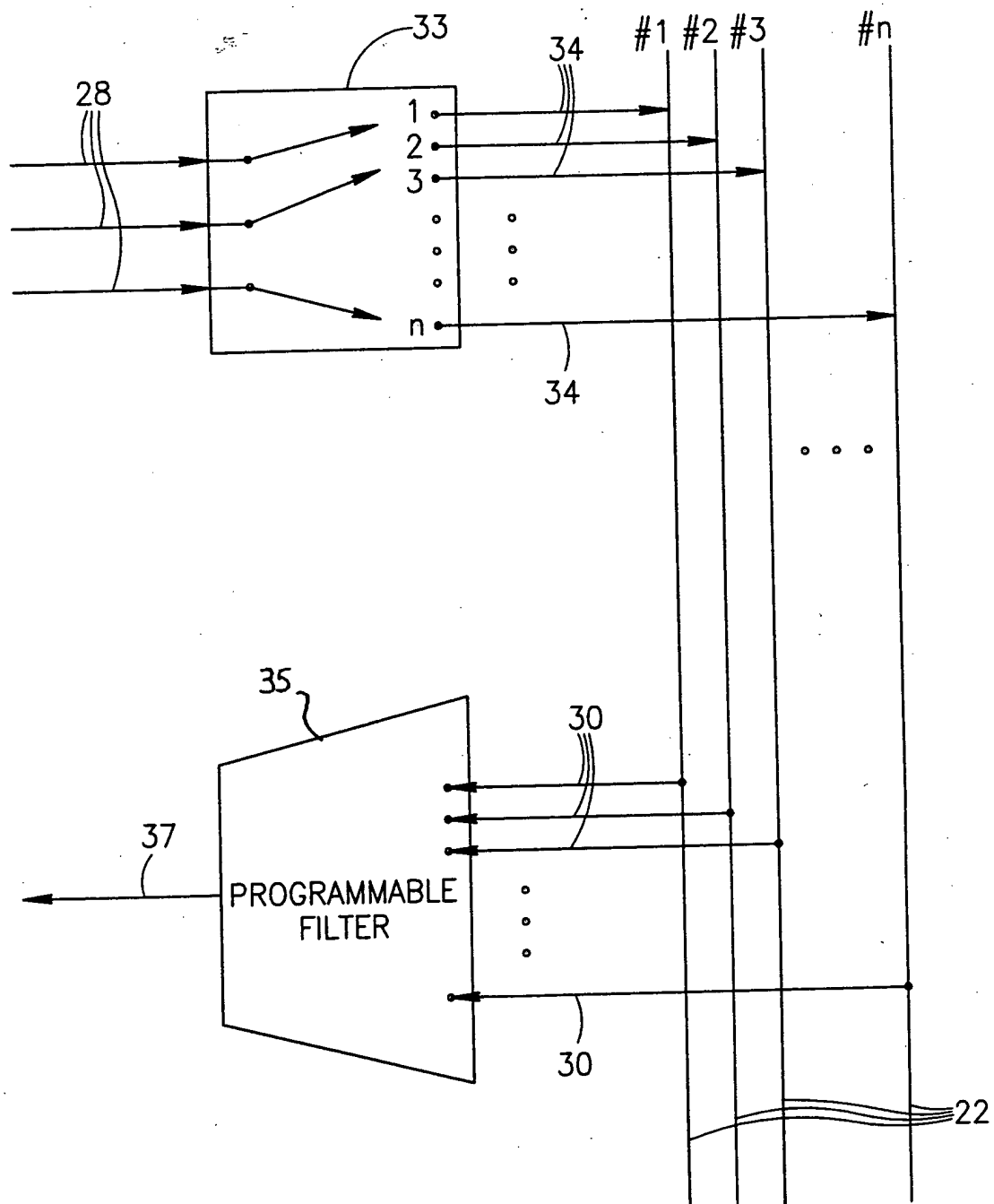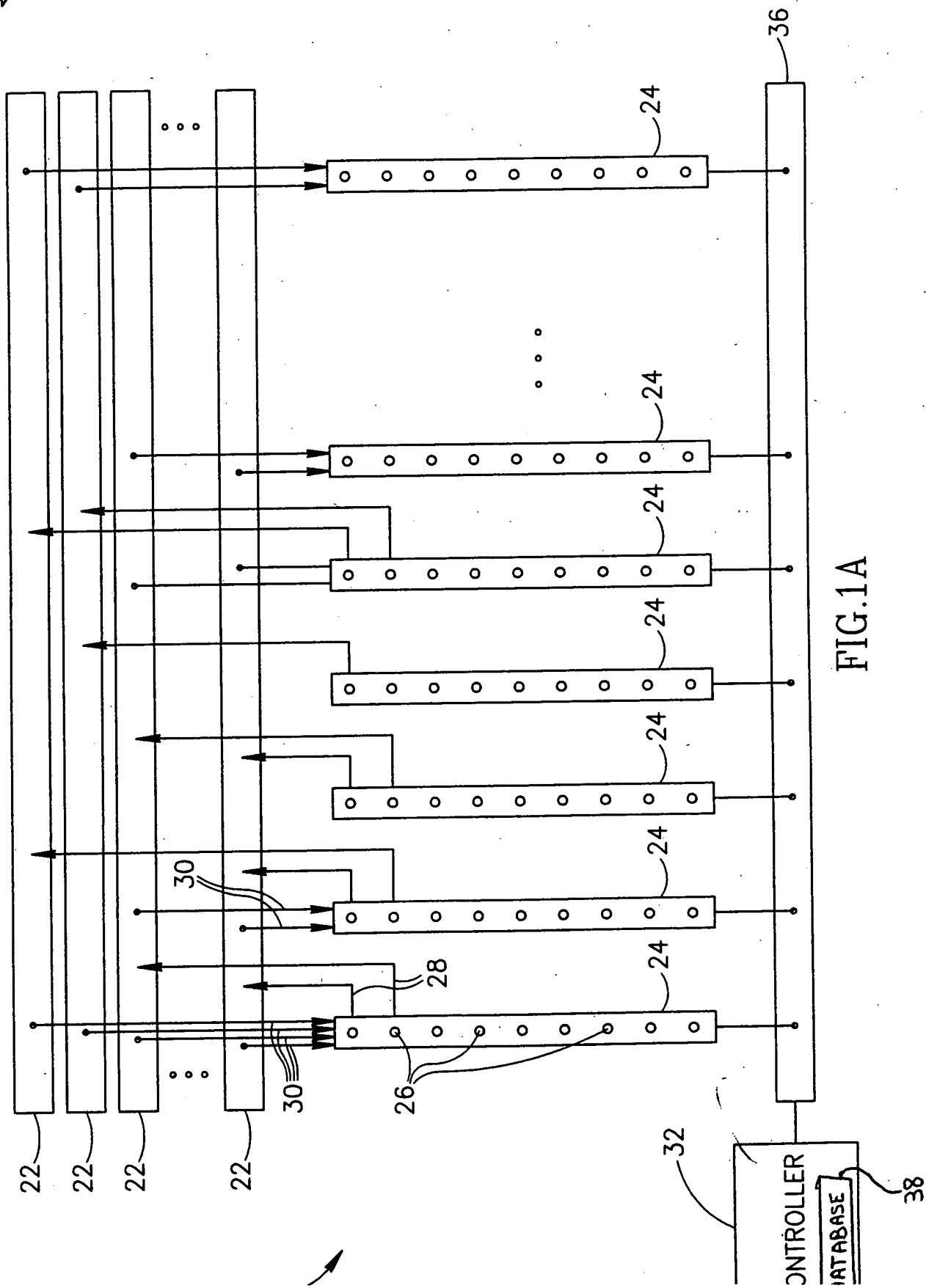
33

28

34

#1 #2 #3   #n

1
2
3
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n

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PROGRAMMABLE
FILTER

:
:
:

30

22

FIG.1B

FIG.1A

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22
22

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24
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24

30
28
30
26

32
CONTROLLER
DATABASE
38
36

FIG. 3